Minutes of public meeting of the PFAS Scientific Advisory Panel on Teams

10am on 7 August 2024

Panel Members present:	Dr Steve Hajioff – Independent Chair
	Dr Tony Fletcher – PFAS and Health member
	Professor Ian Cousins – PFAS and Environment member
In attendance:	Adrian Milner – Public Health support staff
Apologies:	Julia Head – Senior Public Health Officer
	Grace Norman – Deputy Director of Public Health

Welcome:

The Chair welcomed everyone to the Panel meeting, and reminded people the meeting was being recorded.

Dr Hajioff reminded Islanders that queries should be send to the pfaspanel@gov.je mailbox so that the whole panel can feed into the response, rather than sending queries to individual panel members please.

Introductions

The Chair and Panel members introduced themselves.

Dr Steve Hajioff, Independent Panel Chair: A background as a GP for 25 years and a retired Director of Public Health from an area of London with two major international airports and a variety of other environmental hazards and challenges. Not a PFAS expert but has done lots of work with National Institute of Care Excellence and other groups about translating science into policy. Dr Hajioff has also worked a lot in the pharmaceutical industry.

Dr Tony Fletcher, PFAS and Health Panel Member: Environmental Epidemiologist at the London School of Hygiene and Tropical Medicine, working on PFAS since 2006 and member of the panel with experience of epidemiological studies on the health effects of PFAS in contaminated communities in West Virginia in the United States, in the Veneto region, in Italy, and in Ronneby, and is the health expert on the panel.

Professor Ian Cousins, PFAS and Environment Panel Member: A Professor in Environmental Chemistry at Stockholm University, an expert on PFAS, appointed as the environmental expert on this Panel and whose expertise on PFAS is on the sources, transport, fate, and exposure of PFAS.

Support staff for programme management and administration were also in attendance.

Declarations of Interest

Prof Cousins declared that he has been appointed as an expert in a class action lawsuit which is AFFF related outside of Europe. It will be beneficial to this work as it will increase knowledge of AFFF. Dr Hajioff confirmed that the panel had discussed this role and had agreed there are no conflicts of interest.

Minutes of last meeting

Minutes from the meeting of 26th June were reviewed. The Chair asked for the top paragraph on page 12 to be reviewed by the panel. An amendment was made by Dr Fletcher and has been reflected in the final minutes. Prof Cousins commented that he had previously provided written comments on the minutes which Dr Hajioff confirmed have been taken into account.

June 26 was the last meeting on Report 2. A draft report is very near completion and will be available for Islanders to comment upon soon. Dr Hajioff thanked the panel and support staff for their help. There will be a meeting on September 12 to present the draft report and invite comments and suggestions. The final report will then go to Ministers for action.

Minutes for 11 July meeting are not yet available. They will be considered at the next meeting in September.

Additional findings since the last meeting

Meeting with Ministers

Dr Hajioff mentioned that there was a public meeting with Ministers in the preceding week which he was not at. The feedback from Grace via Dr Hajioff in her absence was that it was a productive meeting and there was a meaningful dialogue between ministers and Islanders. Several actions have been taken by Government relating to PFAS. This does not affect the panel's work.

Agenda item 5 – Expert by Experience testimony

The areas the panel requested Islander input are:

- Testing for PFAS
- Interventions to reduce the amount of PFAS in the body
- Testing for diseases/conditions which could be complications of PFAS

An Islander presented evidence to the panel. In the interests of anonymity, the full comments are not displayed in these public minutes, but have been made available to the panel. A concise summary is presented in these public minutes.

The expert by experience Islander spoke to the panel about their health history and health conditions they attribute to PFAS exposure. They described how it impacts their life, and their current health status.

The panel empathised with the Islander's situation and asked several follow up questions. Dr Hajioff asked if the Islander had their PFAS level tested as part of the public health testing programme in 2022. They said that they did, and it was confirmed to be elevated. The Islander asked whether having received several units of blood during their life has impacted on the level of PFAS in their blood. Dr Fletcher commented that it is unlikely that this will impact on the body burden of PFAS as only increasing excretion over time will make a difference. When receiving packed blood cells, the amount of plasma remains the same.

Dr Hajioff reminded those listening that if there is no evidence that a particular health condition is related to PFAS, it does not mean that it is not related, but may just mean that the research has not been done or sufficient evidence has not been found yet.

Dr Hajioff thanked the Islander for their time, commenting that it will influence how the panel work in the future.

Recap on the benefits of phlebotomy – Dr Fletcher

Dr Hajioff reminded the audience that the panel has already published on phlebotomy in Report 1, published in 2023, and the science has not changed since then. Dr Fletcher displayed a presentation summarising what he discovered in the literature review in Report 1 on phlebotomy.

The PFAS compounds of concern in Jersey have a long half life, determined using an AFFF population in Sweden. Blood measurements were repeated every month over a period of a year which allowed the researchers to determine the half life, defined as the period of time taken to reduce the blood serum level of PFAS by half. It is longest for PFHxS at 5 years, 3 years for PFOS and 2 years for PFOA. There is a great deal of individual variation for all of these chemicals and the range of years is much larger. The reasons for the variability are not well understood. Some will be genetic, but there are also environmental factors, for example diet.

For report 3, the various methods that could be used to increase the rate of excretion will be investigated. These include drugs (probenecid, bile acid sequestrants), diet (high fibre diet and probiotic supplements), and reducing amount in blood (taking blood or plasma). These will be investigated through a study of the scientific literature and input from subject matter experts through Panel meetings.

Phlebotomy has been reviewed previously in Report 1. There are three studies available:

1. A case study of a family in Canada with very high PFHxS and PFOS
2. Moderately raised PFAS in Australian firefighters, highest for PFOS
3. A large Italian population exposed to PFOA mainly

Dr Fletcher summarised each of these studies in turn.

1. Case study in Canada

This study was conducted with one family who were high users of home carpet treatment, which resulted in high body burdens of PFAS. Phlebotomy was used as a pilot to reduce levels in the family. Dr Fletcher displayed graphs detailing the change in levels of PFAS in serum, demonstrating that the phlebotomy interventions reduced the levels faster than not intervening. The average reduction was 29% over a year with regular phlebotomies, in comparison to a 12% reduction through natural excretion without any specific interventions. The PFAS reduction due to phlebotomy is 17%, and is calculated as the difference between the intervention and comparison percentage (i.e. 29% - 12% = 17%). Per phlebotomy, the difference is 4.4% per unit of blood for PFHxS, 7.72% for PFOS and 1.47% for PFOA.

	PFHxS	PFOS	PFOA
Baseline serum			
% fall per year in Genuis et al 2014	29.4	47.7	28.5
Expected % fall per year in comparison population (Li et al, 2018)	12.2	18.1	22.9
% fall from Genuis minus expected	17.2	29.6	5.6
% fall predicted for one phlebotomy	4.48	7.72	1.47

2. Firefighters in Australia.

This was a randomised controlled trial to assess the impact of phlebotomy and plasma donation in comparison to not providing an intervention. The firefighters were randomised into three groups, one giving whole blood, one gave plasma donation and the third was the control group and received no interventions. The results show that for those in the control group, their PFAS body burden increased slightly; the firefighters in the study had ongoing exposure due to continuing to use PFAS containing foams and equipment. The blood donation group showed a small drop in PFAS blood levels and the greatest reduction was from plasma donation, which was significantly lower than the control group. Both interventions resulted in had significantly lower levels than the control group.

Phlebotomy

	PFHxS	PFOS	PFOA (approx.)
Baseline serum concentration (ng/ml)	3.6	10.9	1.2
Drop attributed to intervention (ng/ml)	0.6	1.1	0.3
% fall attributed to several phlebot.	16.67	10.09	25.00
% fall predicted from one phlebotomy	3.88	2.35	5.81

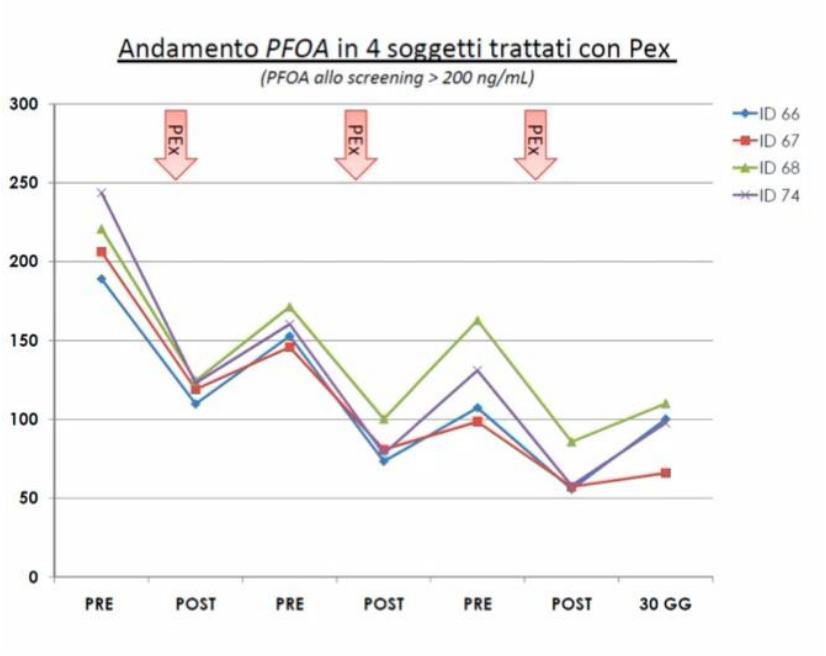
Plasma exchange

	PFHxS	PFOS	PFOA (approx.)
Baseline serum concentration ng/ml	5.2	11.7	1.1
Drop attributed to intervention (ng/ml)	1.5	3.1	0.8
% fall attributed to several plasma ex.	28.9	26.5	72.7
% fall predicted from one phlebotomy	1.47	1.35	3.7

The benefit of the interventions in this study are similar to the Canadian study described previously. The effectiveness varies between PFAS compounds.

3. Large Italian population exposed to emissions from a factory in the Veneto region

Residents in the Veneto area with over 100ng/ml PFAS in blood were offered a programme of plasmapheresis. There were two groups. The first group with between 100 and 200ng/ml PFAS in blood were offered plasma removal intervention where plasma was donated. Those with levels above 200ng/ml PFAS in blood were offered plasma exchange, where plasma was removed and replaced with clean plasma. A report on the preliminary results was not published formally, but a report was available online which summarised the results.



This graph shows the effect of phlebotomy from 4 individuals where each person is a different coloured line. It shows that there is a reduction in PFOA levels after plasma has

been removed, and that the levels increase again, suggesting that once PFOA is removed from the blood it is released from the organs and reaches equilibrium in the blood following each intervention. Overall, the PFOA level reduced by 56% over the three donations.

For plasmapheresis, there is also a clear reduction up to 5 interventions, achieving a reduction in PFAS by over 50%.

To summarise, Dr Fletcher constructed an overall table as displayed below:

	PFHxS		PFOS		PFOA	
Study location:	**Serum med. conc. ng/ml at baseline**	**% reduction from 1 phlebotomy**	**Serum med. conc. ng/ml at baseline**	**% reduction from 1 phlebotomy**	**Serum med. conc. ng/ml at baseline**	**% reduction from 1 phlebotomy**
Canada (phlebotomy)	109.3		39.5		5.7	
		4.48		**7.72**		**1.47**
Australia (phlebotomy)	3.6		10.9		1.2	
		3.88		**2.35**		**5.81**
Australia (plasma)	5.2		11.7		1.1	
		1.47		**1.35**		**3.7**
Italy (phlebotomy)					114	
						3.7
range		**1.5 – 4.5**		**1.4 – 7.7**		**1.5 – 5.8**

Dr Fletcher noted there is always variability between individuals, interventions and compounds. Some types of PFAS are more efficiently excreted than others, but overall, the amount of difference between all variables is small. Therefore, it is reasonable to take the average and conclude that there is around 4% reduction in the level of PFAS in serum caused by the interventions reducing plasma concentrations including phlebotomy, plasma donation and plasma exchange.

To conclude, Dr Fletcher commented that if phlebotomy is conducted at maximum capacity of 6 times a year, the average reduction in PFAS blood levels would be 22%. This compares to a reduction based on the normal half life of an annual fall of 12%, 18% or 23% for the individual compounds. On average, the rate of excretion is doubled if phlebotomy is conducted 6 times a year. Dr Fletcher reiterated that these are average figures, and that the disadvantages and advantages of the intervention needs to be evaluated. He commented that the percentage reductions shown are the percentage of the concentration above background. The percentage reductions attributable to the interventions reduce to zero over time as the serum levels approach background levels.

Dr Hajioff thanked Dr Fletcher for his presentation. He commented that it is important to consider the per procedure reduction both to understand how much PFAS could be reduced by, but also how much discomfort and disruption is required by the patient to get the reductions. Dr Hajioff commented that the panel would need to produce a comparison between the different techniques using a common denominator such as reduction in body burden per month or per three months, but that the panel would discuss this at a later date. Dr Fletcher commented that this calculation should be conducted for different scenarios, such as an average PFAS serum level, half the average serum level of PFAS and twice the average serum level. This analysis would therefore allow an individual to calculate the expected impact for themselves based on their known serum levels of PFAS. Dr Hajioff agreed.

Wider risks and benefits of phlebotomy – Dr Hajioff

Dr Hajioff introduced the need for the panel to consider the wider characteristics of each intervention over and above the impact of reduction of PFAS during the preparation of Report 3. This includes the safety, tolerability, risks, wider benefits, and the safe parameters within which the intervention can be offered. This has already been completed for phlebotomy during Report 1. The science of phlebotomy has not changed in this time, and so this work can be reused in Report 3.

Dr Hajioff indicated that the section from Report 1 had been circulated ahead of the meeting and talked through the paper. He commented that the majority of phlebotomy is conducted for altruistic donation purposes, however it can also be used for therapeutic purposes. Prof Cousins reminded the panel that there have been studies on therapeutic phlebotomy for PFAS which were reviewed in Report 1. These studies conclude that these individuals have lower levels of PFAS, indicating that this technique is effective for lowering body burden of PFAS.

Most of the research on risk has been conducted on altruistic donation situations. This is a situation where the risk of harm to the individual must be carefully considered as there is no benefit to the donor. For this reason, the analysis of risks of phlebotomy is very conservative. Minimum body weights and frequency of this technique are based on this scenario. Often, therapeutic phlebotomy has different guidelines due to a different risk benefit ratio in these conditions. The risk/benefit analysis of this technique in PFAS exposure is likely to be closer to altruistic blood donation than therapeutic phlebotomy.

Dr Hajioff explained the physical risks of phlebotomy:

- Pain and discomfort due to use of needles
- Dizziness and light-headedness
- Bruising, haematoma
- Damage to artery or nerve (rare)
- Infection
- Risk to the health professional of infection from donor
- Reduction in iron levels in donor, develop iron deficiency and iron deficiency anaemia
- Needle phobia

Mitigation on these risks include

- Using sterile technique to reduce infection
- Set criteria of frequency and body weight to reduce risk of light-headedness and iron anaemia
- Supplement with iron in therapeutic phlebotomy scenarios

There is indicative, but not strong, evidence that healthy people who give blood can experience additional health benefits. Non-alcoholic fatty liver disease and cancer risk may be slightly reduced, however the studies are small and it is not clear how well all other factors that could have an effect were controlled for. Researchers have also looked at the impact of phlebotomy on Alzheimer's disease and heart disease, but it is also not clear that there is a benefit from giving blood for these conditions.

Dr Hajioff summarised by commenting that phlebotomy does have risks associated with the procedure, and also has some benefits over and above impacting the PFAS levels, but it is not clear whether these would be seen in the real world.

Dr Hajioff commented that this analysis will be conducted for all other interventions suggested as part of this report so that the panel can make recommendations.

Dr Fletcher commented that the benefit can be estimated in terms of likely reduction in serum concentrations, but the panel cannot equate that to a risk reduction in terms of risk of disease or improved disability-adjusted life years (DALYs). Dr Hajioff agreed with the important point. He said that we are in a different position to the panel were in during preparation of Report 1 due to the IARC announcement regarding carcinogenicity of PFOA in the meantime, and therefore, we are now reducing a carcinogen. Dr Fletcher commented that IARC does not attempt to come up with quantitative dose response data, although the EPA did. They have a risk coefficient in the report, and these numbers could be used but Dr Fletcher recommends not conducting this analysis, partly because it is based on an estimation from different exposure types than that in Jersey, partly because it contains several assumptions, and partly because it does not look at the other health risks which may be more common. Dr Hajioff agreed and confirmed the panel would be determining reduction in body burden, and will have a discussion about what the health impacts might be overall including the caveats in any health impacts discussion. He continued to explain that some medications have wider health impacts, for example bile acid sequestrants lower serum cholesterol, which is an additional benefit of this intervention. This will also form part of the analysis.

Dr Fletcher asked whether the societal benefits should also be considered in this analysis. He questioned whether which is more inconvenient or expensive for the health service to deliver should be considered. Dr Hajioff agreed, and mentioned that it had been spoken about in the public meeting when this report was launched, and that the information was not yet available for this meeting on phlebotomy. He confirmed that the panel needs to consider how effective, safe, well tolerated, cost effective and how affordable it is for the system, and that all this information will form part of the analysis and discussion of each of the interventions to form a balanced judgement.

Prof Cousins indicated that from his preparation prior to the meeting, he learnt that many different techniques have been used to reduce body burdens for many different contaminants other than PFAS. He cautioned that there are treatments which work for other contaminants, but they will not work for PFAS. Dr Hajioff agreed, and explained that if toxins are excreted by the kidney, giving a diuretic can help flush it out of the body, however, because PFAS are reabsorbed in the liver, these medications would not have an impact on reducing PFAS body burden. Prof Cousins mentioned the case of an artificial fat found in Pringles, which was then subsequently used as a treatment for removing dioxins. It was removed from the market as it also stripped out other minerals. This material would not work for PFAS as PFAS is not dissolved in fats. Prof Cousins commented that a freshwater algae being investigated for other contaminant removal would also not work for PFAS. Dr Hajioff agreed that the panel should have this discussion, but that it should focus on areas where the mechanism would work for PFAS and data exists which can then be used for decision making.

Prof Cousins cautioned the public they should be cautious about trying other techniques that may exist, but that will not work for PFAS, and questioned the panel if they thought they should have a section on this in the report. Dr Hajioff said that the panel should consider it in the discussion and recommendations section at the end of the process to avoid Islanders trying interventions which may be ineffective or result in harm.

Any other business

No other business was raised by the panel.

Date of next meeting

Friday 13 September 2024. It will be held 10am-1pm online. The panel will be meeting with Subject Matter Experts during this meeting and the panel will be in Jersey.

There will be an Islander meeting on Thursday 12 September 2024 in Les Ormes, as discussed earlier in the meeting

The Chair thanked everyone for their contributions, those watching the meeting and Adrian for his help during this meeting. A reminder to the public that this meeting has been recorded and the video will be available online on request by emailing the PFAS mailbox. This will take a couple of days to make sure the observers are anonymised.

There being no further business, the meeting was closed.

To note that the Panel can be emailed via PFASpanel@gov.je.

Details of meeting dates and times can be found at PFAS in Jersey (gov.je)